

We Claim

1. An aqueous chemical mechanical planarizing composition comprising:
an oxidizer for promoting barrier removal;
an abrasive;
an inhibitor for decreasing removal of a metal interconnect; and
a carboxylic acid polymer having at least one repeat unit of the polymer comprising at least two carboxylic acid functionalities and wherein the chemical mechanical planarizing composition has a pH of less than or equal to 4 and a tantalum nitride removal rate of at least eighty percent of copper removal rate at a pad pressure of 13.8 kPa.
2. The composition of Claim 1, wherein the carboxylic acid polymer comprises a homopolymer or a copolymer.
3. The composition of Claim 1, wherein the carboxylic acid polymer comprises polymaleic acid.
4. The composition of Claim 1, having a pH of 1.5 to 4.
5. An aqueous chemical mechanical planarizing composition comprising:
0.05 to 15 wt% abrasive;
0.1 to 10 wt% oxidizing agent; and
0.0025 to 2 wt% of benzotriazole; and
0.01 to 5 wt% of a carboxylic acid polymer, wherein at least one repeat unit of the polymer has at least two carboxylic acid functionalities, and wherein the pH of the chemical mechanical planarizing composition is less than or equal to 4 and a tantalum nitride removal rate of at least ninety percent of copper removal rate at a pad pressure of 13.8 kPa.
6. The composition of Claim 5, wherein the carboxylic acid polymer comprises a homopolymer or a copolymer.

7. The composition of Claim 5, wherein the carboxylic acid polymer comprises polymaleic acid.
8. A method for planarizing a semiconductor wafer comprising:
applying an aqueous chemical mechanical planarizing composition to the wafer, wherein the composition comprises a carboxylic acid polymer having at least one repeat unit of the polymer comprising at least two carboxylic acid functionalities; an abrasive; and a corrosion inhibitor for limiting removal of the interconnect metal, wherein the chemical mechanical planarizing composition has a pH of less than or equal to 4; and
polishing the semiconductor wafer, wherein the chemical mechanical planarizing composition has a tantalum nitride removal rate of at least eighty percent of copper removal rate at a pad pressure of 13.8 kPa.
9. A method for planarizing a semiconductor wafer comprising:
applying an aqueous chemical mechanical planarizing composition to the wafer, wherein the composition comprises 0.05 to 15 wt% abrasive; 0.1 to 10 wt% oxidizing agent; and 0.0025 to 2 wt% of benzotriazole; and 0.01 to 5 wt% of a carboxylic acid polymer, wherein at least one repeat unit of the polymer has at least two carboxylic acid functionalities, and wherein the pH of the chemical mechanical planarizing composition is less than or equal to 4, and further wherein the weight percents are based on the total weight of the CMP composition ; and
polishing the semiconductor wafer at a pad pressure less than or equal to about 21.7 kPa, wherein the chemical mechanical planarizing composition has a tantalum nitride to copper selectivity of at least eighty percent of copper removal rate.
10. The method of Claim 9, wherein the carboxylic acid polymer comprises polymaleic acid.